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ABSTRACT

This booklet presents a step-wise sequence for incorporating environmental objectives into any instructional program. The process involves determination of awareness, selection of the environmental problem, identifying subject area units, writing environmental objectives, specifying skills, naming concepts and content, developing unit instructional procedures, and developing questions and activities. The roles of others outside the classroom in managing and initiating environmental instruction are discussed with emphasis on department heads, superintendents, peer teachers, and regional or state curriculum personnel. Sample evaluation forms, such as a student questionnaire and a teacher response sheet, are included in the booklet. (MR)

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designing an environmental curriculum . . . a process

GENERAL EDUCATION AND CURRICULAR SERVICES
THE UNIVERSITY OF THE STATE OF NEW YORK
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FOREWORD

Never let it be said that life does not exact the measure of men in order that they and their heirs may live it well and usefully. However, the way we now live our lives has raised serious questions concerning our ability to guarantee useful, productive, and equally, if not more, rewarding lives for those who will follow us. For, in striving to continually improve our quality of life, we frequently equate this better life with the development and acquisition of material goods and creature comforts, which process seldom guarantees a critical analysis of the consequences of our actions. We often overlook the fact that our natural environment is a closed system which must be protected in order that it might replenish itself, and in so doing, us. In fact, there are elements within this system which, for all practical purposes, are not replenishable or renewable. If we consume and abuse without caution beyond this capacity for replacement, and exhaust that which is not renewable, we foreclose many options otherwise available to succeeding generations.

The wisdom of our daily actions is recorded indelibly upon our natural surroundings. The mechanics of government, the rise and fall of the economy, energy politics, and individual actions in the name of the individual all exact an incredible toll upon the very system which supports us. It is all too clear that the attitudes, values, and behavior

widely exhibited in society today generally lack the enlightenment and foresight that will be required to weigh present actions in terms of future consequences.

Granted, environmentalists, educators, and citizens have much to be proud of in terms of their achievements vis-a-vis the increased public awareness of the environment and the impact of our encroachments upon it. Much has been done through legislative action and individual initiative in redressing some of the wrongs we have perpetrated upon the natural environment, especially since the first Earth Day in 1970. However, more remains to be accomplished than is possible or wise to hope for if we react to environmental problems only at such time as they approach crisis proportions.

Education has an enormous responsibility for generating environmental awareness in society as well as for enlightening those among us of another generation who may have some predetermined and faulty notions about how society and the environment interact. Our commitment, then, must be to make the best use of the educational resources available to us, in order that young people, as they leave the educational system and become decisionmaking adults, may be adequately prepared to assess their actions in terms of what constitutes the "good life" and how it may be achieved and maintained for the greatest number of people. This, of course, requires that people be equipped with the information and basic analytical skills necessary to consider life holistically—that the interdependence of actions and their consequences, as they pertain to the natural as well as the manmade environment, must be recognized, understood, and dealt with.

This process manual is a manifestation of the beliefs stated above and, as such, is provided as a practical means by which educators may effectuate their commitment.

The Federal grant which made the publication possible was directed by Barry W. Jamason, who has also planned and developed all of the Department's environmental education publications.

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INTRODUCTION

This process manual is an attempt to blaze a trail through the bewildering mass of approaches, information, and resources which have arranged themselves around the problem of society's environmental condition. A great number of educators are concerned with environmental problems but many either do not see a viable connection between these problems and their instructional programs, or they do, but they are uncertain as to what is the most practical method for incorporating such concerns into daily instruction.

As a beginning, it would be appropriate to consider that environmental education is:

- a new approach to teaching and learning about man's relationship to his environment: how he affects, and is affected by, the world around him
- an integrated educational process dealing with man's natural and manmade surroundings
- experience-based learning, using the total human, natural, and physical resources of the school and surrounding community as an educational laboratory
- an interdisciplinary approach that relates all subjects to a whole-earth "oneness of purpose"
- directed toward "survival" in a technological society
- life-centered and oriented toward community development
- an approach for developing self-reliance in responsible, motivated members of society
- a rational process for improving the quality of life
- geared toward developing behavior patterns that will endure throughout life

Therefore, understanding what environmental education is and what it can do, we must recognize the setting or the operative conditions in the world today:

- dynamic populations with their concomitant, increasing needs
- inescapable disruption of (natural) ecosystems (e.g., technological intrusion on the environment)
- unequal distribution of resources and population
- failure of individuals to relate environmental misuse and deterioration to personal lifestyles, choices, and individual actions
- slowness of government to recognize the imperative for environmental planning and management
- society's inability to grasp the significance of the

return likely to be realized on its current, poor investment in environmental concern
- the environmental condition as a mirror of society's values

Given these conditions, and with environmental education as the tool, it is imperative that we should:

- examine the dynamics of population
  - —Are we considering all of the effects of, and the alternatives to, our present rates of economic and population growth?
- plan more wisely so as to limit the degree to which we disrupt ecosystems
- consider the gap between the "haves" and the "have nots"
  - —Does the United States unwittingly establish unattainable standards (economic, etc.) which other nations must of necessity emulate to an increasing degree of frustration?
- reorganize our institutions and resources to deal with the causes of environmental problems rather than ineffectually grappling with their symptoms
- educate society to act less precipitously and with more concern for consequences
- recognize that values are, to a degree, culturally prescribed and may thus be culturally revised
- realize that the knowledge, skills, and attitudes we purvey in most of our classrooms relate to our natural and manmade surroundings and bear a significant relationship to the problems we perceive in our environment

One optimistic conclusion might be that society is capable of assessing its own limitations, potential, and needs, and thus requires only a suitable, meaningful context in which to do so; and that this context is education.

It follows then that the major goal of environmental education should be to promote effective participation in the social processes which will prevent continued environmental degradation while furthering the means of improving the quality of life. To accomplish this, individuals must be educated to understand the need for effective participation in the social processes which affect life through an awareness of environmental problems and to understand the consequences of not finding solutions for these problems.

If we accept the above as a rationale, the task remains to reduce the problem of incorporating environmental education objectives to its simplest terms. If we continue to "take time out" from the everyday instructional program to deal with environmental problems, they will remain

adjunct concerns. On the other hand, if we prepare a program of instruction which is customized with, or has environmental objectives built in, our attention to such concerns will be as regular and automatic as the societal occurrence of the problems themselves.

The process described on the following pages then suggests a simple formula for curriculum modification, integration, or infusion which can be effectuated at any level of instruction, in almost any course of study, and with varying degrees of involvement. At least, the procedure requires a small amount of additional planning time for a teacher, and, at most, it suggests a modest expenditure of district funds which will support such modification of the curriculum on a districtwide basis.

The sequence of steps which will be presented and explained constitutes the process as developed and refined by students, teachers, curriculum coordinators, administrators, and State Education Department personnel who were involved in a federally funded environmental education curriculum development project. The sequence is in no way intended to be an arbitrary, lockstep approach to the infusion of environmental concepts and activities into the curriculum. Rather, it is intended that, while the method developed proved efficacious, the various steps are prone to modification depending upon local exigencies, and in fact, some steps might prove to be readily interchangeable. In general, the process is an utilitarian adaptation of the "scientific method" to the problem of incorporating environmental objectives, understandings, and activities into existing curricula.

The process for environmental infusion is presented on the following pages in PART I—A SAMPLE UNIT in chart form. Succeeding the chart is an explanation and justification for each of the eight process steps in PART II—THE PROCESS. Beyond this, PART III—ARTICULATING THE PROCESS is a section which describes, via a diagram and in narrative fashion, the linear relationships of the matter of environmental education and this process to the public school system's organizational structure; to the breadth of applicability of environmental problems; and to the personal involvement in them by learners.

PART I—A SAMPLE UNIT

The sample unit which follows is a recapitulation, in chart form, of the steps of the environmental infusion process described on pages 7 to 14. It must be emphasized here that the sequence and approach are not an arbitrary attempt to prescribe instructional program planning steps, but rather are meant to describe the important elements to be considered in environmentalizing subject matter units.

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
STEP 1— **Determine awareness and commitment**	Civic Responsibility	**Land as a resource**
STEP 2— **Select environmental problem or issue**		**Land use**
STEP 3— **Match subject matter unit with environmental concern**	*Social Studies—Grade 7*, Topic 8: Local and State Government and Civic Responsibility	
STEP 4— **Write environmental objectives**	To categorize the rights and responsibilities of citizens in relation to the organization and function of government	**To determine the responsibility of government in weighing the rights of private ownership against the welfare of the community in terms of the way land is used and the (environmental) effects of such use**

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
	To understand the nature of community services provided by governments	
STEP 5— **Specify skills to be used**	Interviewing, surveying community opinion, discriminating between hearsay and factual evidence, writing letters to public officials	**Same as those to the left and, assessing responsibility for governmental action; determining needs of the community based upon custom, tradition, and future projections; establishing priorities**
STEP 6— **Identify understandings, concepts, and content**	Government is an organization formed to perform services for people for which they have a common need; other topic understandings as appropriate	**Selected materials on land use policy; information re: economic development, (best source for this age level probably resource *persons*); understandings and concepts related to "land as a resource and its use"**
STEP 7— **Develop unit instructional procedures**	Those normally adopted for unit development, although any which emphasize the role of citizens in decisionmaking would be especially appropriate	**Conduct class on a brief site visit of land at issue.** **Have selected class members interview contractor *and* town officials.** **Instruct class to develop a list of alternative uses of the land.**

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
STEP 8— Questions—Related Activities—Resources Identification	Those normally provided in texts, references, and teacher lesson plans	• If the project were halted, how would this affect employment in the area? • Would the general community benefits deriving from a more appropriate (if such is the case) use of the land (for recreation, agriculture, dairy farming, game management preserve, etc.) offset the social costs of unemployment (presumably temporary)? • Develop a homemade simulation of a model community with which students may role play land use decisionmaking.

PART II—THE PROCESS

STEP 1—Assess or develop an awareness of environment.

This procedure would include reviewing the meaning of the term, considering the significance of man's impact upon the environment, and discussing the range of problems engendered by this impact and its effect upon our quality of life. Also, determine the existence of, or the potential for, a commitment to environmental awareness, concern, or improvement on the part of the class members. Refer to page 1 for some general statements, definitions, and observations about environmental education. Although the prime objective of including environmental understandings in a classroom program or a school curriculum is to increase environmental awareness and evoke a commitment, it is useful to determine to what extent such awareness or commitment exists already (because it usually does). Frequently, the first step is to merely understand the support for such objectives which students hold at the outset, and to capitalize upon it while proceeding to subsequent steps.

One might simply ask students to respond to a poll-type (Gallup, Harris, Roper, etc.) listing of the nation's (or the world's) problems by ranking them in order of significance. Environment will either rank fairly high in its own right, or, once the list is viewed in terms of, "which problems lend themselves to individual action (the student's, or anyone's) and participation in solutions, environment will become personal, pertinent, and relevant. And in fact, such a personal approach leads logically to the next step.

The poll below was adapted, with permission, from a Louis Harris Survey prepared for release on Thursday, December 12, 1974. It represents the reactions of a cross section of 1,525 adults to the question:

> "What do you feel are the two or three biggest problems the government should do something about? Any others?"

ISSUES OF CONCERN

	1974	*1973*	*1972*
	%	%	%
Economy	82	72	57
Integrity in government	22	43	5
Energy shortage	16	10	—
Crime	15	17	16

	1974 %	*1973* %	*1972* %
Pollution, ecology	9	11	13
Taxes	9	11	40
Welfare reform	8	13	15
Foreign policy	5	4	29
Housing	5	2	3
Drugs	4	14	19
Education	4	9	7
Older people	4	7	10
Alienation	3	8	1
Health care	2	3	5
Racial discrimination	2	7	21

Note: Percentages add to more than 100% because some people cited more than one problem.

A similar poll would serve the purpose suggested above. In fact, the same poll would be useful for students to use once they are involved in some of the activities which will emanate from environmentally infused units.

STEP 2—Select the environmental concern or problem to be incorporated into the instructional unit or lesson plan.

Using some common, generic list of environmental problem categories, such as the one in Appendix A of this manual, single out those problems which have the greatest potential for infusion into your instructional units on the basis of:

- their pertinence (locally, regionally, etc.)
- your own interests, motivation, and background
- the nature of your subject area
- the educational experience (grade level) and ability of your students

You will be able to make these determinations once you see, in the examples of lessons and units described in this manual, in the subject matter/environment unit supplements (see Notes, page 46), and in the earlier Department publications, *Living Within Our Means: Energy & Scarcity, K–6,* and *Living Within Our Means: Energy & Scarcity, 7–12,* the degree to which the environmental concern becomes involved in the subject matter, and the relative ease with which this involvement is established.

Having thus revised the list of problem categories, distribute copies to your class and discuss it with them to determine wherein their greatest interest lies. Then select a problem (or problems) which you feel can be readily incorporated into the work normally planned for

your subject area and level of instruction. The prime consideration here is that the students be permitted to exercise some choice in selecting problems which are meaningful to them and which, when incorporated into your program, will give them opportunities for problem-solving and decisionmaking. (There may be some local environmental problems which have the advantages of familiarity and proximity, and which many students would readily choose as deserving of attention.)

STEP 3—Identify the subject area lesson or units which relate to, or support investigation of, the selected environmental problem.

Numerous units within most courses of study will lend themselves readily to the selected problem. Once these relationships are established, it is then possible to calendar the inclusion or infusion of environmental objectives, procedures, and activities in the instructional program.

Examples:

Environmental Concern	Subject Area	Unit or Topic
Energy: Fuel supplies	General Science (9)	Efficiency
Population: Growth rate	Mathematics (11)	Functions and Relations
Land Use: Construction	Social Studies (7)	New York in a Megalopolis
Land Use: Urban renewal	Language Arts (10–12)	Society
Economic/Social/ Cultural Environments: Communications	Social Studies (4–6)	Recognize & Utilize the Various Forms of Speaking Social Organization-Mobility of the American People
Transportation: Mobility or Population: Mobility		

STEP 4—Infuse the identified unit environmentally ("environmentalize" it) in terms of developing at least one environmental objective for the unit of study.

Once the unit has been selected, it must then be broadened to accommodate the environmental concern; or, to state it another way: the unit must be infused with environmental elements.

To begin with, if the environmental problem or concern is land use; if the subject area and grade level in question is 7th grade Social Studies (as in the Sample Unit on pages 4–6); and if the selected unit is local government (town, village, or city); then, while a normal unit objective would be:

- to describe the nature of community services which are provided to residents as a responsibility of local government

an environmentally oriented unit objective which might be added would be:

- to determine the responsibility of government in weighing the rights of private property ownership against the general welfare of the community in terms of the way land is used and the (environmental) effects of such use

A comprehensive list of environmental instructional or performance objectives is provided on page 38 as a guide to your own efforts in environmental/subject area unit development.

STEP 5—Underscore the skills to be used or developed in the attainment of the objectives and identify any other skills implicit in the environmental infusion.

If some of the skills to be used in the regular unit are those of interviewing, conducting surveys, composing letters to government officials, then these same skills would be used in achieving the environmental objective. Other skills particularly germane to the environmental element in relation to the illustrative unit could be needs assessment and prioritizing.

Skills to consider which are particularly appropriate to environmental units and which might be developed or refined by students are the following:

- defining (key terms and phrases)
- researching (baseline data)
- investigating (probable causes)
- surveying (community residents; school population)
- contrasting (opposing viewpoints on an issue)

- prioritizing (uses of resources; development plans for a community)
- formulating conclusions (based on data gathered)
- hypothesizing (solutions)
- proposing compromises (between areas of conflict)
- evaluating (information, opinions, results)
- relating problems to causes
- implementing solutions (based upon data-collection, and experimentation hypothesis)
- assessing needs (of a community, or society in general)
- classifying data (with respect to appropriateness of problem area [sorting], and level of sophistication or complexity)

STEP 6—Outline the knowledge, understandings, and concepts to be included in the unit as the environmental supplement to that content which already pertains due to the nature of the subject matter unit.

The specific material that the students receive or discover with regard to the regular unit objective would be augmented with other information and references which deal with the environmental issue. For example, local newspaper editorials about pressures brought to bear by building contractors in order to free their hands in land development, and warnings or actions by Federal and State agencies about soils, water supply, etc., as this information applies to development of the land in question, represent information specific to the environmental problem which is at hand or is readily obtainable for student and teacher use.

Select or develop at least one environmental understanding which will be suggestive of the kind of minimum awareness and cognitive result that might be exhibited by students once the unit is completed.

For example:

- Land is a limited resource and, as such, decisions pertaining to its use must reflect the needs of society as much as, if not more than, the needs of a given individual.

Further examples of environmental understandings are provided on page 43.

If there is a need to have access to an even more common denominator for the wedding of these social studies and environmental elements, the teacher might subscribe to something like the following:

Concept	Explanation
Right vs. Responsibility. . .	satisfying the requirements of suitability or convenience vs. accountability . . . . man has exercised his (presumed) right with little regard for his responsibility (for the environment)

Other concepts are presented and defined on page 41.

STEP 7—List the instructional procedures which will specifically attend to the environmental objective for the unit and include them with the procedures established for the regular subject unit; or, modify the subject matter unit's original procedures to achieve the same result.

It then becomes necessary to elaborate upon your instructional procedures in order that the additional objective is served. Some which might be useful in the illustrative unit are:

- visit the site which has prompted the land use question.
- interview a contractor and town councilman regarding the question of "the greatest good for the most people" as it pertains to the use of this land.
- compare the viewpoints of these interested parties with those of average citizens in the communities.

STEP 8—Develop questions and related activities and identify resources to supplement unit study.

Questions which further develop the unit theme and explore the avenues for achieving the objectives will naturally evolve out of use of the unit material and procedures. Frequently, additional questions directly related or tangential in nature will emerge, along with activity ideas. These may be noted for further expansion of the unit or serve as catapults into other units. Collect resources and identify people as a means of enhancing or supplementing the information base for the unit study. Actually, this could very well be a procedure, i.e., that the students would, once knowing the issue, gather information themselves about the resources to be used in the unit study. Resources will vary with the type of unit and environmental issue, and with the nature of the local community. The most likely initial sources are people and governmental agencies. For example:

- If construction on the site were halted, how would this affect employment in the area?
- Would the general community benefits derived from a more appropriate (if such is the case) use of the land (for recreation, agriculture, dairy farming, game management preserve, etc.) offset the social costs of unemployment (presumably temporary)?

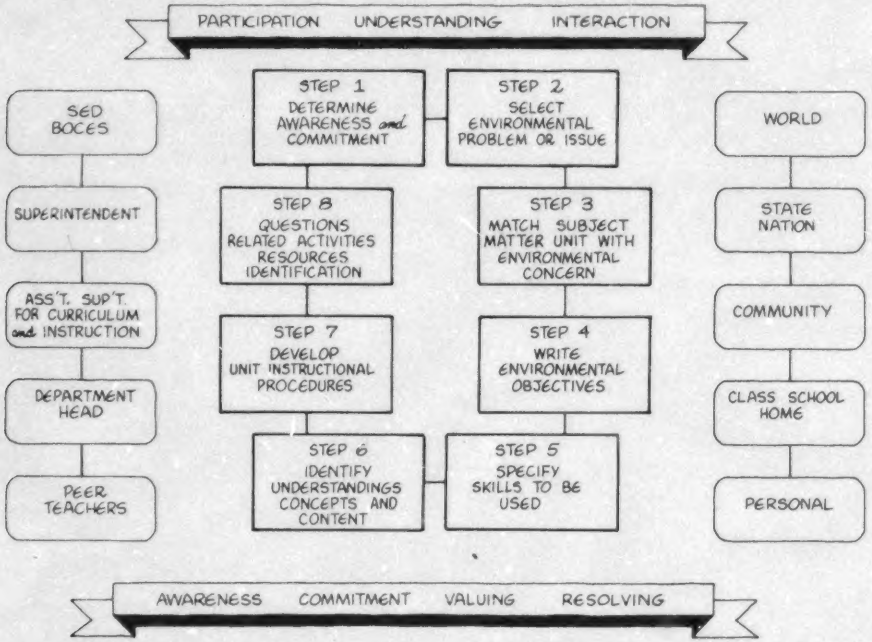
An additional activity could be to develop a simulation exercise involving a model community for which students role play and use decisionmaking.

PART III—ARTICULATING THE PROCESS

There are a variety of ways in which and levels at which environmental education may become part of the instructional program. Once a part of the program, or even before it is introduced into the program, environmental education and the impetus it affords may also be characterized by kinds or levels of support and management it generates, depth of problem investigation enjoined, or intensity of personal participation evoked. However, underlying all of these trappings and descriptions is the unalterable fact that the teacher and the learner remain the "dynamic duo." What the teacher chooses to prepare and impart, the extent to which the student participates in the preparation and impartation, and all the interactions thereof, stand as the simplest, most basic formula of understanding and achievement.

By way of illustrating the foregoing, the following diagram emphasizes this central role of the curriculum process used by the teacher to achieve educational objectives, while presenting the relationship of this process to participation, involvement, issues, and behavior in terms of levels and/or intensity. In PART II—THE PROCESS, the centrality of the instructional development component was examined in chart and narrative form as a means of providing a flexible, manageable approach to incorporating environmental education into the regular instructional program in most or all subject areas. Here, in PART III, we examine other dimensions of the teacher-learner process participation and ramifications of the process beyond this central or fundamental learning situation.

ARTICULATING the PROCESS


PARTICIPATION UNDERSTANDING INTERACTION
SED BOCES
SUPERINTENDENT
ASS'T. SUP'T. FOR CURRICULUM and INSTRUCTION
DEPARTMENT HEAD
PEER TEACHERS
STEP 1 DETERMINE AWARENESS and COMMITMENT
STEP 2 SELECT ENVIRONMENTAL PROBLEM OR ISSUE
STEP 8 QUESTIONS RELATED ACTIVITIES RESOURCES IDENTIFICATION
STEP 3 MATCH SUBJECT MATTER UNIT WITH ENVIRONMENTAL CONCERN
STEP 7 DEVELOP UNIT INSTRUCTIONAL PROCEDURES
STEP 4 WRITE ENVIRONMENTAL OBJECTIVES
STEP 6 IDENTIFY UNDERSTANDINGS CONCEPTS AND CONTENT
STEP 5 SPECIFY SKILLS TO BE USED
WORLD
STATE NATION
COMMUNITY
CLASS SCHOOL HOME
PERSONAL
AWARENESS COMMITMENT VALUING RESOLVING

Support and/or Management of Environmental Education

If one could but rest assured that every teacher would include environmental objectives in the instructional program, then the echelons beyond the classroom would need only be effective support units. However, not all teachers will, and initiative must frequently come from outside this teacher-learner combination. Thus, our first consideration is the support for, and/or management of, the process at various levels within the public school system. Since we shall assume optimistically that a great number of teachers will be motivated to undertake such a process of their own accord, Case A, which follows, describes how the echelons of education may be used as support for their efforts. But, recognizing that some will not, Case B describes the involvement of these echelons from the standpoint of managing or initiating environmental infusion.

	Case A (support)	Case B (management)
Peer teachers:	cooperative identification of pertinent issues which transcend subject matter; team teaching	not applicable
Department head (or grade level coordinator; or teaching team leader):	facilitation of team teaching, scheduling and other arrangements which will permit program flexibility; endorsement of individual teacher's infusion efforts	initiate team teaching and peer teacher projects which incorporate environmental objectives; reorder departmental priorities
Assistant Sup't. for Curriculum & Instruction and District Curriculum Coordinators:	approval of individual teacher efforts to infuse environmental elements and recognition of these efforts as germane and legitimate in terms of objectives and class time	institute curriculum development activities based upon environmental infusion; establish environmental education as a high-ranking district curriculum priority; supervise instruction in a manner which encourages teacher initiative in this area
Superintendent:	explanation to board and community of the teacher(s') utilitarian approach to combining environmental objectives with subject matter objectives; affirming and encouraging these teacher initiatives	mandate environmental education as a district priority, evoking community and board support; direct district staff in the implementation of this priority
Regional (BOCES) and State (SED) Curriculum Personnel:	endorsement; program planning; identification of resources beyond the district; promulgation of the process on a district sharing basis; assistance in preparing supportive funds applications	designate authority for managing, promoting and abetting school district environmental education curriculum development; correlate community, regional and statewide environmental problems with extant subject matter instructional objectives

Levels of Involvement

It should be determined at the outset of instruction, using environmentalized units, to what degree a teacher and students may, for practical purposes, become involved in environmental issues. Most of the issues listed in Appendix C are manifested in some way or another in events or conditions which occur at all levels of society (personally, locally, regionally, statewide, nationally, and globally). The question becomes one of deciding whether it is feasible to talk about land use, for example, beyond one's own community, since the discussion and any resolutions or decisionmaking become abstractions. On the other hand, if the unit objective for achieving the ascribed understanding is met, in terms of its ramifications locally, then consideration of the same issue at a different level may be a profitable extension of the understanding. Ideally, if the understanding can be successfully projected upward as far as the problem is pertinent, (e.g., world population problems) even as an abstraction, the greater the benefit to the learner.

Internalizing the Affective Change

Closely tied to the dimensions or levels that characterize the issue is the matter of the learner's attitudinal change. Often students will progress from apathy, unconcern, or simply incognizance through awareness to commitment and valuing. An even more desirable outcome results when learners construct or hypothesize practical solutions or alternatives. They have thus become involved in the management or resolution of an issue. However, if this is an anticipated outcome for some units, then one's sights must be set lower as regards the level of problem involvement (e.g., Population Density in Our Community), since students will derive little satisfaction and experience much frustration if they attempt to manage or resolve world population problems. On the other hand, they may quite easily contribute to the community's information and awareness with respect to the significance of population growth locally.

The most important outcomes of environmentally infused subject units might then be summarized as follows:

- awareness of environment as an extremely pervasive factor in our lives
- evidence of a commitment to alter some of one's behavior to the end that wiser choices are made in the interests of an improved quality of life
- familiarity with some basic understandings regarding resources, energy, land use planning, air and

water quality transportation, and/or others as represented in the list on page 43

- more interesting and pertinent unit presentations wherein the subject matter is somewhat less an end unto itself and more a vehicle for supporting related inquiries
- a rekindling of learner interest particularly among those who are only marginally successful participants in the unadulterated instructional program
- the awakening of a broad base of initial concern and a feeling of stewardship with regard to our natural and manmade surroundings which will hopefully linger, and even intensify as the learners become mature, responsible, decisionmaking members of society

PART IV—EVALUATING THE PROCESS

In seeking to determine the efficacy of the environmentally infused unit, you may wish to both observe (A. below) the reaction, participation, and understanding of students, and to query (B. below) them by way of gauging their receptivity to the understandings and concepts. You may also wish to record or assess your own reactions (C. below) to the developmental process and the importance of including environmental elements in the program.

A. Observing Students

The students . . . (or Learner A . . .):

- Listened: visibly gave attention
- Participated: asked relevant questions
- Contributed pertinent information:
  - —answered questions
  - —volunteered additional information
- Demonstrated mastery of a skill as specified in the unit (e.g., questioning, surveying)
- Exhibited competence in
  - —a subject matter unit understanding
  - —an environmental understanding
- Offered a solution, suggested a trade-off, or proposed a compromise in terms of the environmental issue or problem central to the unit
- Evidenced a greater interest in the regular subject matter when presented in conjunction with the environmental issue
- Demonstrated a greater understanding of the regular subject matter when presented in support of the resolution of an environmental issue

B. Sample Student Questionnaire

Instructions: Place a checkmark (√) in the column which best describes your feelings about each statement.

	AGREE	NOT SURE	DISAGREE
1. To me, "environment" means all of the people, things, events, and conditions in my home, school, community, State, nation, and in the world.			

If you disagree, please try to describe below what "environment" does mean to you.

_____

_____

_____

_____

_____

	AGREE	NOT SURE	DISAGREE
2. Our environmental problems can be solved.			
3. Environmental problems have always existed, but they are more noticeable today because they affect more people.			
4. My own attitude toward the environment is important and, as such, it can have an effect on the environment.			
5. Most environmental problems are the responsibility of the government rather than the responsibility of individuals.			
6. To solve some of our environmental problems, all levels of government must pass and enforce effective laws.			
7. Schools can help solve environmental problems by offering programs and courses which develop in students positive attitudes toward the environment.			
8. Environmental concerns should be taught at all grade levels so that people will be aware of these problems from an early age and throughout their lives.			

	AGREE	NOT SURE	DISAGREE
9. The environmental unit developed in my class was related to an interest I had before it began.			
10. I was involved in the planning of the unit.			
11. I helped choose the environmental problem studied in this unit.			
12. Most of my classmates were involved in the planning of the unit.			
13. The unit required that I spend time on it outside of class (in addition to normal homework assignments).			
14. As a result of the unit work, I became aware of the causes of at least one environmental problem and its effects on the environment.			
15. I helped develop at least one study activity which would increase understanding of an environmental issue or help solve an environmental problem.			
16. I liked being asked to think and talk about problems with which adults are struggling.			

	AGREE	NOT SURE	DISAGREE
17. I have been reading so much lately about energy crises, environmental concerns, and other related matters that I feel too much of my time is being spent studying about these problems.			
18. I still don't understand most of what I have been reading and hearing about problems with the environment.			
19. Because I was included in this project, I became aware of other environmental problems in my neighborhood and my community.			
20. As a consumer of goods, I would be willing to pay a higher price for a given product, knowing that such additional product cost was due to pollution abatement equipment, impact statements, or resource recovery schemes.			
21. As a result of my work on this unit, I gained a greater respect for my fellow students and their abilities.			
22. As a result of this unit I became more involved in my community and some of its problems.			

	AGREE	NOT SURE	DISAGREE
23. The ecological balance of nature should be a prime factor in all decisions concerning the technological advancement of our society.			
24. Every course should have a unit which incorporates environmental concerns into the course itself.			
25. I am more <u>aware</u> of problems in my environment now that I have taken part in this unit.			
26. I have become more concerned about the environment, and I am anxious to do something positive about it as a result of this unit.			
27. This concern will probably have some effect on the actions I take and on the way I live.			
28. I will be able to help solve environmental problems in the future because of the methods used in this project.			
29. I enjoyed this environmental unit and I would like to take part in this type of work again.			
30. A majority of my teachers seem knowledgeable and concerned about environmental issues.			

C. Sample Teacher Response Sheet

Instructions: Place a checkmark (√) in the column which best describes your feelings about each statement.

	AGREE	NOT SURE	DISAGREE
1. It will probably require severe environmental crises to bring about beneficial environmental changes in our society.			
2. Long-range planning should replace our haphazard, stopgap attempts at environmental solutions.			
3. Environmental concerns should be given a top priority at all levels of government.			
4. Environmental protection is best realized by "tough" laws rather than a rational discussion of its need.			
5. Environmental problems are best solved by changing people's attitudes.			
6. Environmental education will affect attitudes to the point where we will actually see measurable changes in our society in terms of values and lifestyles.			

	AGREE	NOT SURE	DISAGREE
7. All teachers should have some preservice education in the area of environmental concerns.			
8. Teachers have a major responsibility to educate the young about environmental concerns.			
9. As an educator, I feel that attention to environmental concerns should be developed throughout the many areas of the curriculum to which they are appropriate.			
10. I feel students could benefit greatly from team teaching of environmental studies.			
11. Environmental problems are overemphasized, and are leaking into curriculum areas in which they do not belong.			
12. Since relevancy is now a major consideration in choosing topics for study in high school classes, more attention should be paid to environmental issues than has been the case in the past.			
13. My students were involved in the identification of at least one of the environmental problems studied.			

	AGREE	NOT SURE	DISAGREE
14. My students became more aware of the causes of at least one problem and its effects on the environment.			
15. As a consequence of their participation in this unit, my students have attained an increased awareness of local, State, and national environmental problems.			
16. This unit has improved the problem-solving abilities of my students.			
17. The unit activities developed to consider the environmental problems were appropriate for the students' grade level.			
18. Units of this type can be used with students of all ability levels.			
19. Environmentalization of the unit added a creative dimension to the standard syllabus.			
20. Students exhibited positive interest and involvement in environmental issues pertaining to course work.			

	AGREE	NOT SURE	DISAGREE
21. At the beginning of the unit, the students showed evidence of being able to independently identify environmental problems in their community.			
22. Students were hesitant to forsake traditional course activities in favor of activities designed to achieve environmental understandings.			
23. The unit resulted in greater student classroom participation in discussions than is normal for my classes.			
24. Students exhibited increased awareness of local environmental newsstories and newspaper articles.			
25. I found that I had to go too far beyond the confines of my own curriculum area in developing the units.			
26. It is too difficult to find meaningful lessons to meet my curricular objectives and deal with environmental concerns simultaneously.			
27. The facts concerning the environment are either too complicated, too vague, or inconclusive to teach a meaningful lesson.			

	AGREE	NOT SURE	DISAGREE
28. Environment has been a regular or recurring issue in my classroom by virtue of its importance.			
29. I feel that the major environmental concerns lie principally in the area of the pure sciences and not in all academic areas.			
30. The amount of unit planning required was a negative factor.			
31. Prior to being a participant in this curriculum, I customarily incorporated environmental units into the standard curriculum or syllabus.			
32. It was necessary to spend much time in researching content in order to develop the unit.			
33. I used teaching methods in this unit which differed from my usual methods.			
34. I focused on subject matter in these units that I do not normally include in my teaching.			
35. I enjoyed the process of developing and teaching the units.			
36. I plan to develop more units in this fashion as often as is practical.			

	AGREE	NOT SURE	DISAGREE
37. I was pleased that my students "had fun" with the units because I consider "enjoyment" an important component of the educational process.			
38. I like teaching in an integrated, interdisciplinary way.			
39. I feel that my school and school system does more than an adequate job in dealing with environmental concerns.			
40. The units (modules) developed could be incorporated without difficulty into the curriculum of most school districts.			
41. To effectively use the unit, a school district would have to commit additional time and resources.			
42. As a result of this unit, I will be interested in pursuing related environmental projects.			
43. Involvement in environmental curriculum development has assisted me personally in making some decisions in light of long-range environmental impacts.			

PART V—ADDITIONAL SAMPLE UNITS

SAMPLE UNIT 1—(ENVIRONMENT/GENERAL BIOLOGY)

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
STEP 1— Determine awareness and commitment	The needs of green plants	**The needs of living things**
STEP 2— Select environmental problem or issue		**Natural Environments: The needs of living things**
STEP 3— Match subject matter unit with environmental concern	*General Biology*, Unit 4—The Green Plants	
STEP 4— Write environmental objectives	To demonstrate the relationship of green plants to their environment, and their dependence upon it	**To examine the needs of living things, such as green plants; to construct parallels and reveal interdependencies of plant systems and humans systems**
STEP 5— Specify skills to be used	Observe, document, and describe change; develop experimental control situations; photograph examples of plant and human systems	**Draw comparisons (human and plant systems), isolating similarities and differences.**

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
STEP 6— Identify understandings, concepts, and content	Understandings 110–114 on pp. 49–51, *General Biology*	Understanding: Any one of an environment's components, such as air, water, food, energy, may become a limiting factor Concepts: survival, interdependence
STEP 7— Develop unit instructional procedures	Activities as provided on pp. 49–51, *General Biology*	Have students develop categories of basic needs for living things other than humans and for humans. How are these categories similar? Demonstrate how the basic needs for humans and for plants are interdependent.
STEP 8— Questions—Related Activities—Resources Identification		• What elements of human systems are fragile and subject to changing to environmental conditions? • Which environmental problems are man-caused?

SAMPLE UNIT 2—(ENVIRONMENT/LANGUAGE ARTS, 10-12)		
PROCESS STEPS	**UNIT DEVELOPMENT**	**ENVIRONMENTAL ELEMENTS**
STEP 1— **Determine awareness and commitment**	Critical and Interpretive Reading	**Transportation**
STEP 2— **Select environmental problem or issue**		**Mass Transit vs. Motor Vehicles and Highways**
STEP 3— **Match subject matter unit with environmental concerns**	*English Language Arts, Reading Section K–12:* Critical and Interpretive Reading, Levels 10–12	
STEP 4— **Write environmental objectives**	To evaluate information in terms of source (author, et al.); to incorporate past experiences into reading; to analyze persuasive material; to recognize exaggerations; to understand use of inferred details	**To become familiar with information proposing greater emphasis on mass transit and with that which supports continued growth of the interstate system; to investigate the rationale of the automobile industry**
STEP 5— **Specify skills to be used**	Understanding inferences; inferring; analyzing reading material, assessing authenticity of data	**Same as those to the left and, discriminating between objective and subjective presentations, readings, data; analyzing the relationship of the common environmental good to private interests in light of environmental impact of burgeoning vehicular population**

PROCESS STEPS	UNIT DEVELOPMENT	ENVIRONMENTAL ELEMENTS
STEP 6— Identify understandings, concepts, and content	Same as those to the right (In the case of English Language Arts, which is a skills development program, the understandings, concepts, and content are environmental elements.)	**EPA data; Detroit data; scarcity; the growth rate of energy consumption is threatening enough that we must consider the alternative of increased mass transit use over increased use of the inefficient automobile**
STEP 7— Develop unit instructional procedures	See activities on pp. 52–53 of *English Language Arts Reading Section K–12*: Critical and Interpretive Reading, Levels 10–12.	**Adapt the activities listed to the left to the environmental objectives, using reading materials, published testimony, etc., relating to transportation problems**
STEP 8— Questions—Related Activities— Resources Identification	• Do personal biases and vested interests seriously undermine "factual" presentations? • How objective can and must we be in an age when few things other than news copy are black and white? • Is news copy really "black and white"?	• **Who is the best judge of how highway trust fund money should be used?** • **How may these judgments best be made?** • **What prevails against our adoption of more effective and wide-ranging mass transit systems?**

APPENDIX A—CATEGORIES OF ENVIRONMENTAL ISSUES, PROBLEMS, AND CONCERNS

Chemical, Biological, and Radiological Contamination:

- Agricultural chemicals
- Pesticides, fungicides, herbicides, insecticides
- Metal poisoning
- Detergents
- Plant and animals diseases
- Pests
- Mine tailings
- Radiation (microwave, et al.)

Consumerism:

- Packaging
- Advertising
- Product durability
- Consumer information
- Impulse buying
- Status products

Economic/Social/Cultural Environments:

- Lifestyle
- Housing
- Jobs
- Poverty
- Trade balances—comparative advantage
- Civic responsibility
- Cultural identity—assimilation
- Communications

Energy:

- Power generation
- Fuel supplies
- International trade policies
- New systems and concepts (geothermal, solar, nuclear)

Environmental Planning and Design

(See also Land Use and Pollution: Visual/Aesthetic.)

Health:

- Pollution
- Food additives
- Drugs
- Stress (congestion, population density; competitiveness)

Land Use:

- Reclamation/flood control
- Construction
- Strip mining/erosion
- Planning
- Recreation
- Open space/scenic and historic preservation
- Real estate
- Urban renewal

Natural Environments:

- Habitats
- Endangered species
- Communities/ecosystems
- Survival

Pollution:

- Air
  - Particulates
  - Engine emission
  - Incineration
  - Industrial effluent
  - Smog
- Water
  - Flood control
  - Sedimentation
  - Thermal discharges
  - Soft and solid waste (See also *Solid Waste.*)
  - Agricultural runoff
  - Municipal sewage systems
  - Limnology
- Noise
  - Traffic
  - Construction
  - Industrial
- Visual/Aesthetic
  - Signs and billboards
  - Construction design
  - Transmission lines
  - Landscape architecture
  - Graffiti

Population:
- Distribution and density
- Growth rate
- Migration
- Mobility
  - and food supply
  - and resources

Resources:
- Recycling
- Renewable
  - Soil
  - Water
  - Forests
  - Fishery and wildlife management
- Nonrenewable
  - Minerals
  - Fossil fuels (See also *Energy*.)

Solid Waste:
- Recycling
- Recovery
- Disposal methods
- Source reduction (packaging)

Transportation:
- History
- Mass transit
- Motor vehicles and highways
- Aircraft and airports
- Safety
- Traffic congestion
- New systems and concepts
- Mobility

APPENDIX B—ENVIRONMENTAL EDUCATION INSTRUCTIONAL OBJECTIVES

Step 4 in PART II—THE PROCESS involves the development of environmental performance objectives which are to be included in the modified curriculum units. The objectives provided below may prove to be useful as they are stated, or as guides in the development of a teacher's own objectives.

If our goal is to educate individuals to understand the need for effective participation in the social processes which affect life, through an awareness of environmental problems and the consequences of a lack of solutions for them, then a student should be able to:

1. Identify the problems affecting society's environment, through reading, investigation, and reporting.
2. Relate data from other disciplines to the subject area in which an environmental problem is studied.
3. Analyze and interpret the decisions society makes affecting the environment.
4. Identify and enumerate a society's values that affect the environment.
5. Demonstrate a grasp of the principles and generalizations of an ECOSYSTEM.
6. Identify problems which occur as a result of population growth.
7. Analyze the effects of urbanization of his environment.
8. Discuss the limitations and restrictions society places upon itself in the name of survival (e.g., limitations on disposals of private property).
9. Identify the historical basis for the condition of the current environment.
10. Demonstrate an awareness of local, State, and national efforts to protect the environment.
11. Prepare simple questionnaires for gathering information about community reactions to local environmental problems.
12. Develop a means to share environmental information with schoolmates, parents, and community.
13. Cite common factors in local, national, and international environmental concerns.
14. Design and test hypotheses to explain environ-

mental problems in the community.

15. List 10 of the world's most serious environmental problems.

16. Contrast the use of the environment by peoples of other times and places with present use.

17. Describe some of the governmental processes (local, State, or Federal) which influence the quality of our environment.

18. Explain how different cultures influence the physical factors in the environment.

19. Demonstrate an awareness of environmental problems by recognizing such in the community and by reacting to news items.

20. Initiate letters to local officials and newspaper editors suggesting solutions for local environmental problems.

21. Conclude that our society, as a leader in technological advancement, is obliged to help the world meet its energy and food needs.

22. Show a concern for the welfare of the starvation-level nations by contributing money and nonperishable foods through local or national charitable organizations.

23. Recognize and describe the limits of the earth's energy resources.

24. List and describe present and alternative sources of energy.

25. Make informed judgments on energy sources in terms of environmental impact.

26. Communicate concerns for the environment.

27. Recognize the need for open space and identify the tradeoffs that would be required.

28. Identify attitudinal changes toward environmental problems.

29. Participate in action programs planned to counter a specific environmental problem.

30. Critically examine the ecological implications of technological "advances" before endorsing them (examples: SST, catalytic converters, geothermal energy, etc.).

31. Analyze options and select those least harmful to the environment.

32. Record, document, and report observations of environmental issues.

33. Demonstrate a willingness to forego enjoyable activities that upset the environment.

34. Defend "concerns" for the environment.

35. Refrain from abusing public parks and areas.

36. Dispose of wastes more intelligently and consider long-range consequences to the environment.

37. Differentiate between renewable and nonrenewable resources.

38. Categorize the world's resources as renewable or nonrenewable.

39. Discuss the ramifications of continued "unlimited conspicuous consumption."

40. Relate consumption habits to resource depletion.

41. Identify some renewable and nonrenewable resources in danger of depletion or extinction.

42. Explain the purpose of resource management.

43. Promote the elimination of wasteful consumption habits of nonrenewable resources.

44. Analyze the problems affecting the environment.

45. Defend and support with facts a position taken concerning possible solution(s) to an environmental problem.

46. List and describe pollutants of the environment.

47. Identify and assess the impact of technology on the environment.

48. Demonstrate an awareness of the importance of the oceans in the biosphere and the current and future efforts that will be needed to protect them.

49. Design a problem-solving approach to an environmental problem.

50. Explain how the physical factors in man's environment influence his culture.

51. Construct an "Environmental Bill of Rights" and an "Environmental Bill of Responsibilities."

52. Recognize visually attractive patterns in nature and utilize them as design for manmade products.

53. Define and give examples of the following terms: interrelationship; adaptation; succession; scarcity; survival; prey-predator relation; competition; diversity.

54. Recommend specific resource material (books, magazines, governmental publications) for obtaining information about environmental issues.

55. Cite some methods that can be used to recover, reuse, or recycle waste or unused materials.

56. Specify actions which could preclude the necessity to recover, reuse, or recycle wasted materials.

57. Construct at least three reusable items from discarded materials.

APPENDIX C—ENVIRONMENTAL CONCEPTS

While attempting to relate environmental issues to subject matter areas, it is helpful to have at hand some key words or concepts which serve as bridges between them. The concepts below, with their definitions, are inherent in numerous areas of knowledge and thus common to discussions of man's natural and social existence. As such, these "common denominators" or basic concepts should lend themselves to the task of linking environment to subject concerns, for they are fundamental to both.

(A quick reference to pages 2–5 of the Department's publication, *Handbook of Environmental Education Strategies*, will provide illustrations of how these concepts may be used.)

change—dynamic modification . . . the continuous alteration of previously existing forms, styles, and substances

diversity—the condition of being different or having differences . . . the characteristics of variety and dissimilarity which collectively contribute to the harmony of systems

interaction—reciprocal action or influence . . . exchange, stimulation, or influence between or among organisms (including man) within their environment and/or among their respective environments

interdependence—mutual reliance . . . an organism cannot live alone

optimism—anticipating the best possible outcome . . . man has the capacity to make this the best of all possible worlds

planning—detailing a program of action . . . decisions concerning the future must be based on long-term environmental benefits

recyclement—continuous feedback for reuse . . . man would do well to observe nature's example and reuse the results of his technology

right vs. responsibility—satisfying the requirements of suitability or convenience vs. accountability . . . man has exercised his right with little regard for his responsibility to the environment

scarcity—smallness of quantity in relation to needs . . . as populations increase, competition for re-

sources necessitates the establishment of priorities

social forces—agents of change in society . . . society must be moved to insure the preservation of the environment

stewardship—exercising responsible care over entrusted possessions . . . the assumption of environmental responsibility through active participation in the management of problems

succession—sequence, or the condition of time and place order . . . the sequence of identifiable stages as represented by the process of change in biological populations and/or in human systems

survival—continuing life (or existence) in the presence of difficult conditions . . . survival depends upon the ability of an organism to adjust to its environment

valuing—assessing relative worth or importance . . . man is endangering his chances for a better life through the very measures he employs to achieve it

APPENDIX D—ENVIRONMENTAL UNDERSTANDINGS

Some environmental understandings to be used as content for unit development and as a general group of learning expectations for environmental education are provided below.

1. Plant and animal populations are renewable resources.
2. The renewable resource base can be extended by reproduction, growth, management, and recycling.
3. Man must acknowledge that interdependence of all living things dictates the manner in which and the extent to which resources may be used.
4. Natural resources are interdependent and the use or misuse of one will affect others.
5. Social, economic, and technological changes affect the interrelationships, quality, availability, and the use of natural resources.
6. Living things are interdependent with one another and with their environment.
7. Opportunities have been provided for man to experience and enjoy nature.
8. Man has the ability to make this the best of all possible worlds.
9. The arts seem to aid man in feeling a oneness with nature and with fellowmen.
10. Physical well being is a fundamental necessity for survival even though man often places a higher value on other things.
11. Earth's resources and recycling system can support only a limited number of people; therefore, as populations increase and as resource supplies decrease, the freedom of the individual to use the resources as he wishes diminishes.
12. Man has exercised a presumed right to exploit the environment with little regard for his responsibility to preserve it.
13. Ethically, we are stewards rather than owners of the resource base.
14. Historically, cultures with high technological development have used disproportionately more natural resources than those with lower levels of technological development.
15. Individuals tend to select short-term economic gains, often at the expense of greater long-term environmental benefits.

16. The material welfare and aspirations of a culture largely determine the use and management of natural resources.

17. The rate of resource consumption increases in direct proportion to the expansion of our wants, needs, and markets.

18. The waste of natural resources can limit the options available to future generations.

19. Resource depletion can be slowed by the development of substitutes for existing (nonrenewable) resources, prevalent lifestyles, and current priorities.

20. Natural resource policies come about as the result of interacting social processes: science and technology, government operations, private interests, and public attitudes.

21. Individuals should become well informed about the best ways to manage and conserve our energy supplies.

22. In order to preserve our threatened environment, present attitudes must change to reflect a widespread public concern which will encourage protective action by individuals, groups, and government.

23. It is the responsibility of each individual to become aware of existing governmental regulations intended to protect the environment.

24. In a democracy, people must consent to, or insist upon, restrictions on resource allocation and use.

25. Choices between essential needs and nonessential desires are often in conflict.

26. Man currently faces the prospect of endangering his chances of a better life through the very measures he employs to achieve it.

27. Although much needs to be done to improve and preserve our environment, we must stop occasionally and acknowledge the gains that are being made in these directions.

28. The prevailing condition of scarcity which underlies all economic considerations forces changes in the lifestyles of individuals and societies.

29. The limited nature of productive resources makes it imperative that a society define its economic objectives in terms of environmental reality.

30. Man must develop the technological and sociological knowledge needed to control population growth, modify environments, and alter resource use patterns.

31. As population expands and becomes more mobile, man's demands for natural resources increase.

32. The demands of population growth coupled with man's tremendous waste of energy are responsible for some of our more serious environmental problems.

33. Raw materials and energy supplies are generally obtained from those resources available at least cost, with supply and demand determining their economic value.

34. Most resources are vulnerable to depletion in quantity and quality.

35. Any one of an environment's components, such as space, water, air, food, or energy, may become a limiting factor.

36. Natural resources are unequally distributed with respect to land areas and political boundaries, thus creating conflicts over priorities in the use, management, and conservation of these resources.

37. Trade will be mutually beneficial if trading partners specialize in those products in which they have the greatest productive efficiency.

38. The nonrenewable resource base of mineral elements is considered finite, and depletion can only be slowed by altered priorities, new demographic considerations, improved conservation practices, and vigorous recycling procedures.

39. Water is a reusable and transient resource, but the usable quantity may be reduced by impaired quality.

40. Soil, trees, and water are classified as renewable resources, but, because their renewal or revitalization requires a major investment in time and effort, they may be more realistically considered depletable resources.

41. As natural resources become scarcer, the inexhaustible supply of human energy, resolve, determination, and ingenuity must be fully utilized.

42. The Earth's main source of energy is the sun.

43. Energy is initially supplied to an ecosystem by the activities of green plants.

44. The basic function of any ecosystem is to capture and transfer energy.

45. Diversity is a key factor in the survival of an ecosystem.

46. Survival of an organism depends upon its ability to adjust to its environment. Each kind of organism represents a collection of adaptations which fit it for survival under a given set of conditions.

47. The energy requirements of man are met primarily by "food," and men are dependent upon other organisms through food chains and food webs.

48. Man changes the natural environment to the extent that many species find it difficult to adapt to the new conditions.

49. In nature, there is a continuous recycling of many elements.

50. Man would do well to observe nature's example and recycle the results of his technology.

51. Organisms and environments are in constant change.

52. The interaction of environmental and biological factors determines the size and range of species and populations.

53. Pollutants and contaminants in the air are produced by natural and manmade processes.

54. Land forms influence the type of community in which people live.

55. Social values and morals influence environmental attitudes. Mankind is continually developing an ethical base for making value judgments.

56. Increased leisure time necessitates planning for leisure time resources/activities.

NOTES

1. Several publications containing subject matter/environmental units, grades 7–12, will soon be distributed, with accompanying order forms, to all districts. These units have been developed by classroom teachers and curriculum coordinators under the auspices of the PL 91–516 Federal funds (Office of Environmental Education, USOE). They are working models, ready for immediate incorporation into your instructional programs, which reflect the process described in this manual and mirror the sample units provided in PARTS I and V.
2. Supplemental aids in the form of a bibliography, visual aids list, general index references, and environmental subject headings may be found by referring to this Department's publication, *Living Within Our Means: Energy and Scarcity, 7–12.*
3. An annotated list of available Department publications, films, video tapes, and filmstrips may be obtained by directing your request to:

   Barry W. Jamason
   Room 314–G
   The State Education Department
   Washington Avenue
   Albany, New York 12234
   Phone: 518: 474–5890

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